

WHAT IS CLAIMED IS:

1. A multi-site injection system comprising:  
a plurality of medicament delivering  
5 needles/microprotrusions;  
a needle/microprotrusion support;  
a supply of medicament; and  
means for providing the medicament to the  
plurality of needles/microprotrusions in order to effect  
10 delivery into a stratum corneum of a user.
2. The system according to claim 1 wherein the  
support comprises a rotatable drum.
- 15 3. The system according to claim 1 wherein the  
support comprises a guide plate.
4. The system according to claim 1 wherein the  
support comprises a needle plate.  
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5. The system according to claim 1 wherein the  
support comprises a manifold.
6. The system according to claim 1 wherein the  
25 support comprises a carrier sheet.
7. The system according to claim 1 wherein the  
support comprises a shell.
- 30 8. A multi-site injection system comprising:  
a rotatable drum having an outer surface with  
microprotrusions thereon, said microprotrusions having

lumens therethrough for enabling transport of a medicament therethrough from an inner surface of said rotatable drum and into a stratum corneum of a user;

5 a fixed inner drum for supporting said rotatable drum and having at least one radial opening therein for providing said medicament to the microprotrusion lumens;

a supply of said medicament disposed within the inner drum; and

10 a housing for supporting the rotatable drum and the inner drum, said housing having an opening for exposing an arcuate portion of said rotatable drum in order to enable rotation of said rotatable drum by rolling said rotatable drum against a user's skin.

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9. A multi-site injection system comprising:

a rotatable drum having an outer surface with microprotrusions thereon and radial opening for transport of a medicament therethrough;

20 a fixed inner reservoir for storing the medicament and for supporting said rotatable drum, the reservoir having at least one radial opening therein for release of the medicament;

25 a sponge layer covering said rotatable drum for receiving medicament as the rotated drum is pressed and rotated across a user's skin and enabling said microprotrusions to deliver the medicament by penetrating of the stratum corneum of the user.

30 10. The system according to claim 9 wherein said sponge layer is fixed to said rotatable drum.

11. The system according to any one of claims 8-10 wherein said medicament comprises botulinum toxin.

12. A multi-site injection system comprising:

5 a guide plate having a plurality of openings therethrough;

a needle plate having a plurality of needles projecting therefrom, each needle being aligned with a corresponding opening in said guide plate, said needle  
10 plate being movable from a first position with the needles positioned behind a top surface of said guide plate to a second position with the needles projecting from the top surface through the openings; and

a plunger base for moving said needle plate  
15 from the first to the second position.

13. The system according to claim 12 wherein said needles are coated with a medicament.

20 14. The system according to claim 12 wherein said plunger bore includes a reservoir for medicament and needles include lumen therethrough in communication with said reservoir for delivery of the medicament into a stratum corneum of a users skin.

25 15. The system according to any one of claims 12-14 wherein the needles and opening are arranged in a symmetric radial pattern.

30 16. The system according to any one of claims 12-14 wherein the needles and opening are arranged in an asymmetric radial pattern.

17. The system according to any one of claims 12-14 wherein the needles and openings are arranged in a concentric pattern.

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18. The system according to claim 17 wherein said concentric pattern is circular.

19. The system according to any one of claim 12-14 wherein the needles and opening are arranged in a rectilinear pattern.

20. The system according to any one of claims 12-14 said medicament comprises botulinum toxin.

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21. A multi-site injection system comprising:  
a needle plate having a plurality of needles projecting therefrom; and  
botulinum toxin disposed with the needles for delivery to a stratum corneum of a user.

22. A multi-site injection system comprising:  
a needle plate;  
a plurality of hollow needles, fixed to an outside of said needle plate, for transport of a medicament from an inside of said needle plate and into a stratum corneum of a user;  
a pressurizer disposed over an inside of said needle plate to form a cavity therebetween in communication with the needles; and  
an injection port disposed in said pressurizer for introducing the medicament into said cavity.

23. The system according to claim 21 wherein said pressurizer is flexible for causing uniform transport of the medicament through the needles.

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24. A multi-site injection system comprising:  
a needle plate having an inside and an outside;  
a pressurizer disposed on the needle plate  
10 inside to form a cavity therebetween;  
a medicament disposed in said cavity;  
a plurality of needles disposed on the needle plate outside each needle having a lumen in fluid communication with said cavity for transport of the  
15 medicament into a stratum corneum of a user; and  
means for forcing medicament from said cavity through needle lumens.

25. The system according to claim 24 wherein the  
20 means for forcing medicament comprises an injection port disposed in said pressurizer.

26. The system according to claim 25 wherein said pressurizer is flexible for causing transport of the  
25 medicament through the needle lumen.

27. The system according to any one of claims 22-26 wherein said medicament comprises botulinum toxin.

30 28. A multi-site injection system comprising:  
a handle;

a syringe supported by said handle and including a plunger for dispensing a fluid medicament from said syringe;

5 a manifold attached to one end of said handle and in fluid communication with said syringe;

a plurality of needles, protruding from said manifold, for delivery of said fluid medicament from said manifold and into a stratum corneum of a user.

10 29. The system according to claim 28 wherein said manifold is disposed perpendicular to said handle.

30. The system according to claim 28 wherein said manifold comprises a plurality of concentric conduits  
15 interconnected with radial conduits.

31. The system according to claim 30 wherein said concentric conduits are circular.

20 32. The system according to claim 30 wherein the concentric conduits are radially spaced apart from one another.

33. The system according to claim 32 further  
25 comprising a transparent sheet interconnecting the concentric and radial conduits for enabling visual orientation of said manifold onto a patients skin by manipulation of said handle.

30 34. The system according to claim 28 wherein said manifold comprises a plurality of radial conduits.

35. The system according to claim 34 further comprising a plurality of concentric ribs supporting said plurality of radial conduits.

5        36. The system according to claim 35 wherein the concentric conduits are circular.

37. The system according to any one of claims 28-36 wherein the medicament comprises botulinum toxin.  
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38. A multi-site injection system comprising:  
a carrier sheet including a plurality of medicament filled rupturable blisters disposed on an inside surface thereof;  
15        a plurality of needles extending from an outside surface of said carrier sheet, each needle being aligned with a corresponding blister and having a lumen for transport of the medicament into a stratum corneum of a user, each needle traversing said carrier sheet and  
20        positioned for rupturing the corresponding blister; and  
a pressure plate disposed on the carrier sheet inside surface for forcing the blister against the needles for causing rupture thereof and forcing the medicament through the needle lumens.

25        39. The system according to claim 38 wherein said pressure plate is fixed to said carrier sheet.

40. The system according to claim 39 further  
30        comprising a foam pad disposed on the carrier sheet outside.

41. The system according to claim 40 wherein said foam pad covers the needle extending from the carrier sheet outside and is penetrable by said needle.

5        42. The system according to claim 41 wherein said foam pad is adhered to said pressure plate along a perimeter thereof for securing the carrier sheet between said foam pad and said pressure plate.

10       43. The system according to any one of claim 38-42 wherein said medicament comprises botulinum toxin.

44. A multi-site injection system comprising:  
a shell including a top and a bottom;  
15       a plurality of needles protruding from the shell bottom, each needle including a lumen extending through the shell bottom;  
a membrane disposed between the shell top and shell bottom;  
20       an inlet for introducing a fluid between the shell top and the shell bottom; and  
a diverter for selectively directing fluid between the membrane and the shell bottom and between the membrane and the shell top.

25       45. The system according to claim 44 wherein said diverter includes a manually operated valve.

30       46. The system according to claim 45 further comprising a supply of medicament for introduction between the membrane and the shell bottom.



47. The system according to claim 46 further comprises a supply of inert fluid for introduction between the membrane and the shell top.

5        48. The system according to claim 47 wherein said medicament comprises botulinum toxin and said inert fluid comprises a saline solution.

49. A method of multi-site injection comprises:  
10        providing a shell including a top and a bottom, said bottom having a plurality of needles protruding therefrom with each needle including a lumen therethrough and extending through the shell bottom;  
         providing a membrane between the shell top and  
15 the shell bottom;  
         introducing a medicament between the membrane and the shell bottom; and  
         introducing a pressurized fluid between the membrane and the shell top for forcing the medicament  
20 through the needle lumen.

50. The method according to claim 49 wherein said medicament comprises botulinum toxin.